**Background**

Pituitary imaging is important for the evaluation of hypothalamo-pituitary axis defects in patients diagnosed with childhood-onset growth hormone deficiency (CO-GHD). Published evidence shows that there is a close relationship between structural changes in the pituitary gland and growth hormone deficiency.

**Aims**

To evaluate the relationship between clinical, laboratory and magnetic resonance imaging of the pituitary gland in a cohort of CO-GHD patients during the transition period, and to assess the value of pituitary volume as a diagnostic predictor of persistent GHD.

**Methods**

Retrospective case review of patients diagnosed with CO-GHD referred to our adolescent unit between 2012 and 2020.

- Adult GHD (AGHD) was defined as a stimulated growth hormone peak < 3 µg/l.
- Published normative data on pituitary diameters was used to calculate pituitary volumes (Volume = Height \( \times \) coronal length \( \times \) sagittal width \( \times \) 0.5 mm\(^3\)).

**Patients**

Data from 102 individuals (75 males) who underwent retesting of growth hormone reserve at 18.04 years of age (IQR:17.1-19.1) was analysed.

**Assessment of growth hormone reserve in adulthood**

Pituitary Volume Assessment (Table 1)

<table>
<thead>
<tr>
<th>MRI findings</th>
<th>Non AGHD</th>
<th>AGHD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pituitary volume (SD)</td>
<td>0.3 ± 1.28</td>
<td>-0.47 ± 1.36</td>
<td>0.024*</td>
</tr>
<tr>
<td>Anatomically normal pituitary gland</td>
<td>57.1%</td>
<td>76.4%</td>
<td>0.055</td>
</tr>
<tr>
<td>Abnormal posterior pituitary gland</td>
<td>60%</td>
<td>92.6%</td>
<td>0.021*</td>
</tr>
<tr>
<td>Combined Small anterior pituitary gland and abnormal posterior pituitary gland</td>
<td>62.7%</td>
<td>91.7%</td>
<td>0.007*</td>
</tr>
<tr>
<td>Septo Optic Dysplasia</td>
<td>67.6%</td>
<td>81.3%</td>
<td>0.261</td>
</tr>
<tr>
<td>IGF-1 off treatment (SD)</td>
<td>0.73 ± 1.51</td>
<td>-0.67 ± 2.11</td>
<td>0.001*</td>
</tr>
</tbody>
</table>

**Predictive Value of Pituitary Volume**

Multivariate analysis of logistic regression suggested that pituitary volume, MPHD and IGF1 (SD) off GH therapy are good predictors of AGHD ([SE 88.5 %, SP 27.3%] p 0.02*)

Pituitary volume was negatively correlated with:

- Multiple pituitary hormone deficiency (MPHD) (p:0.006*)
- Persistence of growth hormone deficiency in adulthood (p:0.024*)

Anatomically normal pituitary gland did not decrease the likelihood of being diagnosed with AGHD.

**Key message**

- Measurement of pituitary gland volume by MRI combined with IGF-1 concentrations off GH treatment could help clinicians to rationalise the extent of GH axis re-assessment in patients with IGHD/MPHD at transition.